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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,319	04/11/2006	Naoki Matsumura	14434.93USWO	3615

53148 7590 12/09/2009

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EXAMINER	
PATEL, SMITA S	

ART UNIT	PAPER NUMBER
1793	

MAIL DATE	DELIVERY MODE
12/09/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/575,319	MATSUMURA ET AL.	
	Examiner	Art Unit	
	SMITA PATEL	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 August 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's amendment filed on August 10, 2009 has been entered..

2. Claims 1-14 are pending.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. **Claims 1-3, 5-9 and 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato (JP 2001-135352, machine translation) in view of Berkowitz et al (US Patent No.: 7,459,234)

As per Claims 1, 7-8 and 14, Kato teaches non-aqueous electrolyte secondary battery comprising positive electrode containing lithium ions where in positive electrode includes active material such as lithium cobalt oxide or acetylene black or graphite. In addition, contains positive electrode collector body constituted of Al, Mg, and Si alloy and the shape can be sheet, a network, a film and etc. (abstract, paragraph 0004, 0011, 0014-0017, 0025). Kato teaches thickness of the composition is from 1-30 micrometers (equivalent 1-30 microns). Kato does not expressively mention average composition obtained by averaging the ratios of elements composing the collector in the direction of

thickness of the collector is equal to a composition of an alloy whose liquidus temperature is 630° C or lower.

However Berkowitz teaches cathode can include current collector including aluminum on which cathode active material can be coated or otherwise deposited. The current collector can have region in contact with positive least and second region in contact with the active material. The current collector serves to conduct electricity between positive lead and the active material and made of a material that is strong and is good electrical conductor. The current collector can include a 2000 series aluminum alloy, a 3000 series aluminum alloy, a 5000 series aluminum alloy contains primarily aluminum and magnesium, a 6000 series aluminum alloy contains primarily aluminum, magnesium and silicon or a 7000 series aluminum alloy (Col.4 lines 23-50). Berkowitz mention the wt% of some aluminum alloys as presented in Table 1 but doe not expressively mention averaging the ratios of elements composing the collector in the direction of thickness of the collector is equal to a composition of an alloy whose liquidus temperature is 630° C or lower. However liquidus temperature of 630° C or lower would be obvious since Berkowitz teaches Al-Mg -SI alloys and further supported by applicant's disclosure on page 5. Further it would have been obvious to one of the ordinary skill in the art at the time of invention that average composition is obtained by averaging a ratio of elements composing the collector in a direction of thickness of the collector is equal to composition of alloy since Berkowitz teaches series of aluminum alloy as described above which would contain Si and Mg content that overlaps with claimed ranges, thus some with liquidus temperature lower than 630° C, to reduce the cost since aluminum

alloys are less expensive and to provide greater corrosion stability and conductivity in a battery as taught by Berkowitz. Further it shown in the evidence by Bennett (US Patent No.: 4, 469,395, Col.3 lines 25-45) which mentions 4000 series of aluminum alloy containing 4.5-6.0 wt% of Si and 5000 series of aluminum alloy containing 4.5-5.5 wt% of Mg content.

It would have been obvious to one of the ordinary skill in the art at the time of invention to combine the teaching of Kato and Berkowitz to provide greater corrosion stability and conductivity in a battery as taught by Berkowitz

As per Claim 2,Kato teaches collector comprises a layer formed of an alloy Al and at least one element such as Mg and Si (abstract).

Berkowitz teaches collector comprising of alumiunm or aluminum alloys (considered aluminum and at least one element, Col.1 lines 62-66).

As per Claims 3 and 5-6, Kato teaches the positive electrode collector containing Al, Mg and Si so it would be obvious that at least one element such as Mg or Si and aluminum disposed on both sides of the layers as to have an excellent oxidation and corrosion resistance.

As per Claim 9, Kato and Berkowitz teaches aluminum alloys containing silicon and magnesium but does not expressively mention composition containing in amount of 99.5 wt% in average composition. It would have been obvious to optimize the claimed weight percent based on the preference and other requirements which would provide greater corrosion stability and conductivity in a battery as taught by Berkowitz. "Generally, differences in concentration or temperature will not support the

patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. ' [W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.' *In re Aller."* Thus, this is a case of *prima-facie* obviousness, as one having ordinary skill in the art at the time the invention was made, given the general conditions taught by Asanuma, would have been able to select the claimed weight percent based on preference or other requirement (see MPEP 2144.05).

4. **Claims 4 and 10-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato (JP 2001-135352, machine translation) in view of Berkowitz et al (US Patent No.: 7,459,234) and in further view of Asanuma et al (US Patent No. 6,001,139).

As per Claim 4, Kato teaches non-aqueous electrolyte secondary battery containing positive collector containing aluminum in sheet as described above in Claim 1 but does not expressively teach plurality of island regions dispersed in the sheet.
Berkowitz teaches cathode can include current collector including aluminum on which cathode active material can be coated or otherwise deposited as described above in Claim 1 but does not expressively mention plurality of island regions dispersed in the sheet.
However Asanuma teaches the positive or negative electrode to be used is prepared by coating material mixture layer containing positive electrode active material or a negative

electrode active material on a current collector. When the positive or negative electrode is in sheet like shape, it's desirable to arrange the material mixture layer on both sides of the current collector and the material mixture layer on one side may comprise a plurality layers. In addition to material mixture layer, electrode may also have protective layer undergoing in the current collector and intermediate layer to be arranged between material mixture layers. Positive electrode current collector is prepared from stainless steel or aluminum and has net sheet, foil, lath or the like shape. Lithium containing transition metal oxide positive electrode active material is used, for example lithium cobalt oxide. Lithium is desirable as the light metal where metal forms alloy with lithium such as Aluminum, Al-Mg (Col.8 lines 54-67, Col.9 lines 1-67, Col.11 lines 13-16, Col.21 lines 3-5). Since Asanuma teaches positive electrode collector comprising of aluminum sheet and having plurality of layers, it would have been obvious to have plurality of island regions dispersed in the sheet and the island containing at least one element to have an excellent charge/discharge cycle characteristic, high density and high charge and discharge capacities as taught by Asanuma.

It would have been obvious to one of the ordinary skill in the art at the time of invention to combine the teaching of Kato and Berkowitz to provide greater corrosion stability and conductivity in a battery as taught by Berkowitz. Further, It would have been obvious to one of the ordinary skill in the art at the time of invention to modify the teaching of Kato and Berkowitz to include the plurality layers comprising of positive electrode active material on collector as taught by Asanuma to have an excellent charge/discharge cycle

characteristic, high density and high charge and discharge capacities as taught b Asanuma.

As per Claim 10, Asanuma teaches positive electrode collector contains aluminum preferably on the surface (Col.19 lines 1-19).

As per Claims 11-13, Asanuma teaches in addition to material mixture layer, the electrode also containing a protective layer, an undercoating layer to be arranged on the current collector and intermediate layer to be arrange between material mixture layers and preferably these layers containing electrically conductive particles, insulating particles, binder and like (Col.5 lines 51-67, Col.6 lines 1-31, Col.8 lines 54-67 and Col.9 lines 1-5). Electrically conductive particles such as metal oxides can be used (considered oxide layer, Col.15 lines 39-41 and Col.16 lines 16-18) and binder containing polybutadiene or fluorine base coating material (considered liquid-repellent property, Col.16 lines 29-63).

Response to Argument

- Applicant's arguments filed on August 10, 2009 have been fully considered. In view of applicant's argument based on Harada reference found persuasive and therefore, previous rejection has been withdrawn. However upon further consideration, a new ground of rejection is made based on newly cited reference **(Berkowitz (US Patent NO.: 7,459,234)** and in combination with various previously cited prior art.
- **Regarding to applicant argument to using Asanuma reference**, Examiner has added new reference Berkowitz et al (US Patent No.: 7,459,234) which teaches

average composition of Al, Mg and Si and therefore arguments using Asanuma reference are moot in view of Berkowitz et al and Kato.

- **Regarding to applicant argument to using Kato's reference,** Examiner has added new reference Berkowitz et al (US Patent No.: 7,459,234) which teaches average composition of Al, Mg and Si, some of which overlap the claimed range and thus have liquidus temperature lower than 630° C, and therefore arguments using Kato reference are moot in view of Berkowitz et al.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SMITA PATEL whose telephone number is (571)270-5837. The examiner can normally be reached on Monday-Thursday, 8:00-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Melvin Curtis Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SP, AU1793
12/04/2009

/Melvin Curtis Mayes/
Supervisory Patent Examiner, Art Unit 1793